L	Hits	Search Text	I DB	Time stamp
Number				12me Beamp
4	203	hideo with nakagawa	EPO; JPO;	2003/05/29
	1		DERWENT;	14:32
			IBM TDB	13.32
5	4	(hideo with nakagawa) and (etching or	EPO; JPO;	2003/05/29
		etched) and organic and plasma	DERWENT;	14:32
	-	dia prasma	IBM TDB	14:32
6	0	(hideo with nakagawa) and (etching or	<u> </u>	2002/05/00
		etched) and organic and plasma	EPO;	2003/05/29
7	1	("20010049150").PN.		14:32
	_	(20010013100) . 1 1 1 .	USPAT;	2003/05/29
8	1	("6451620").PN.	US-PGPUB	14:33
	_	(0101020).IN.	USPAT;	2003/05/29
9	3	(("6296701") or ("5756401") or	US-PGPUB	14:37
-		("4944026")).PN.	USPAT;	2003/05/29
10	17897	etching and organic and plasma	US-PGPUB	14:38
	1,057	Ctching and Organic and prasma	USPAT;	2003/05/29
11	2441	etching same organic same plasma	US-PGPUB	14:39
- -	2331	conting same organic same prasma	USPAT;	2003/05/29
12	70	(otohing game amenda assault	US-PGPUB	14:40
	/ /	(etching same organic same plasma) and ((sputter or sputtering) with cleaning)	USPAT;	2003/05/29
13	53	((sputter or sputtering) with cleaning) ((etching same organic same plasma) and	US-PGPUB	16:16
10	33	((eputton on anuttoning) with	USPAT;	2003/05/29
i		((sputter or sputtering) with cleaning)) and @ad<=20010510	US-PGPUB	16:19
15	46			
10	40	(((etching same organic same plasma) and	USPAT;	2003/05/29
		((sputter or sputtering) with cleaning))	US-PGPUB	15:32
		and @ad<=20010510) and (trench or opening		i
16	46	or recess or hole or via)		
10	40	((((etching same organic same plasma) and	USPAT;	2003/05/29
		((sputter or sputtering) with cleaning))	US-PGPUB	15:33
		and @ad<=20010510) and (trench or opening		
		or recess or hole or via)) and (chemical		
17	17	or plasma)	}	
1/	17	(((((etching same organic same plasma)	USPAT;	2003/05/29
		and ((sputter or sputtering) with	US-PGPUB	15:33
		cleaning)) and @ad<=20010510) and (trench		
	i	or opening or recess or hole or via))		
		and (chemical or plasma)) and (nitrogen		
20	660	with plasma)		
۷ ا	660	((sputter or sputtering) with cleaning)	USPAT;	2003/05/29
21	2.5	same (argon or He or Ar)	US-PGPUB	16:26
21	86	(((sputter or sputtering) with cleaning)	USPAT;	2003/05/29
		same (argon or He or Ar)) and (plasma	US-PGPUB	16:27
		with nitrogen)		
22	69	((((sputter or sputtering) with cleaning)	USPAT;	2003/05/29
1		same (argon or He or Ar)) and (plasma	US-PGPUB	16:19
		with nitrogen)) and @ad<=20010510		
23	25	(((((sputter or sputtering) with	USPAT;	2003/05/29
	Ī	cleaning) same (argon or He or Ar)) and	US-PGPUB	16:19
ļ		(plasma with nitrogen)) and		
_	}	@ad<=20010510) and (organic or polymer)		1
24	126	((sputter or sputtering) with cleaning)	EPO; JPO;	2003/05/29
ĺ	ļ	same (argon or He or Ar)	DERWENT;	16:26
			IBM TDB	
25	1	(((sputter or sputtering) with cleaning)	EPO; JPO;	2003/05/29
	ĺ	same (argon or He or Ar)) and (plasma	DERWENT;	16:27
		with nitrogen)	IBM TDB	
			םחד זחם	

US-PAT-NO:

US 6511575 B1 DOCUMENT - IDENTIFIER:

TITLE:

Treatment apparatus and method utilizing negative hydrogen ion

- KWIC

Abstract Text - ABTX (1):

In order to eliminate a contact hole of a semiconductor substrate, a **polymer** dreg after ashing of all inside of a via hole is conducted, or an oxide layer cleaning is done by assisting a negative hydrogen ion having its less generated on a barrier metal surface, hydrogen gas is changed to a hydrogen radical, introduced onto a wafer arranged in a vacuum container. In this manner, radical is primarily changed to a negative hydrogen ion, and the ion is secondary electrons without imparting plasma damage to an element.

Application Filing Date - AD (1):

19991110

Brief Summary Text - BSTX (12):

method for sputtering a barrier metal surface using inert gas plasmas such as gas such as chlorine (refer to Japanese Patent Application Laid-Open No. 7-226387), and a method for reducing and eliminating a natural oxide film on argon, a method for etching a barrier metal surface using plasmas of halogen Here, in plasma cleaning before depositing aluminum, there are known a

barrier metal surface using hydrogen plasmas (refer to Japanese Patent Application Laid-Open No. 8-298288).

Detailed Description Text - DETX (64):

According to the aforementioned treatment method of the present invention, oxide films adhering to the conductor surface or organic materials such as photo resist residues are eliminated, and the surface can be cleaned. while damage due to charging is limited, foreign objects such as a natural

Detailed Description Text - DETX (71):

deposited on the surface SF of the barrier metal 61 on the side wall and bottom source drain area for an element formed on a wafer, or a structure of a groove as air between the steps of forming the barrier metal 61 and post-etching, and covered with a thin oxide layer by being exposed to an oxygen atmosphere such a resist is eliminated by ashing. The surface SF of the barrier metal 61 is barrier metal 61 an insulation film 62 is deposited on which a photo resist of the groove during etching, and the **polymer** may not be sufficiently eliminated in the subsequent ashing step, and a **polymer** dreg RS may remain. being exposed to oxygen plasmas in the ashing step. Further, a polymer is continuity between wires. In this example, after forming a first layer of FIG. 17 is a sectional view showing a structure of a contact hole in a 63 called a "via hole" or "through hole" and a barrier metal 61 to ensure pattern is formed and etching for forming the groove 63 is carried out.

Detailed Description Text - DETX (73):

eliminated by a physical cleaning (eliminating) method using Argon sputtering, a chemical cleaning method using chloride trifluoride, or a reactive plasmas Thus, before depositing the wiring material, a surface oxide layer is cleaning method using halogen based gas and plasmas.

Detailed Description Text - DETX (121):

substrate is conveyed from the reaction chamber 104 to the reaction chamber 106 reaction chamber 104, and the gate valve of the reaction chamber 104 is closed. inside of the reaction chamber 104 is depressurized to about 13.3 Pa to 133 Pa. via the carrier chamber 108 is conveyed from the reaction chamber 103 into the to 450.degree. C. in the chamber 106. Then, DMAH gas and hydrogen gas are introduced, and aluminum is deposited on the barrier metal nitride by the CVD A gate valve of the reaction chamber 103 is opened, the cleaned substrate Nitrogen plasma treatment is carried out in the reaction chamber 104. The properties are improved. The gate valve of the chamber 104 is opened, the via the carrier chamber 108 and the substrate is maintained at 160.degree. maintained. In this reaction chamber, grow electric discharge plasmas of nitrogen gas is generated using a parallel, flat plate shaped electrode. the barrier metal on the substrate surface is a nitride, and the barrier and the substrate is heated at 200.degree. C. to 450.degree. C. and

Detailed Description Text - DETX (139):

reference numeral 434 denotes a gate electrode, reference numeral 435 denotes a first inter-layer oxide film, reference numeral 436 denotes a first layer metal element separation oxide film, reference numeral 433 denotes a gate oxide film, In FIG. 27, W denotes a silicon substrate, reference numeral 432 denotes an wire, reference numeral 438 denotes a reflection proof film of a first layer metal wire, 439 denotes a second inter-layer oxide film, reference numeral denotes a via hole formed as a groove by dry etching, NOX denotes an oxide layer with its thin reflection proof film surface, RS denotes a residue of wire, reference numeral 437 denotes a barrier metal of a first layer metal polymer adhered in dry etching for forming a via hole.

Detailed Description Text - DETX (140):

introduced by a natural oxide film or ion shock during etching or a residue RS In the via hole 440 on a silicon substrate surface, a crystal defect

layer metal wire. A method for manufacturing a semiconductor device that meets by a positive ion treatment, a positive charge introduced by plasmas flows a gate electrode 434 through a first layer metal wire 436. Finally, a voltage is applied to a gate oxide film 433 existing between a silicon substrate W and the current flows the gate oxide film 433 at a destruction voltage or less, thereby and thus, it is desirable to maintain a vacuum between cleaning and the second charge-up phenomenon associated with plasmas When this cleaning is carried out oxide film 433 results in electrostatic breakdown. In addition, a fine tunnel removed by cleaning. However, when these residues are taken in air after cleaning treatment, a natural oxide film is formed again on a cleaned surface, gate electrode 434. When this voltage reaches a breakdown voltage, the gate second layer metal wire 440 is formed, a resistance value of the via hole is increased by a natural oxide film, a crystal defect, or impurities, bringing These residues are Thus, when a this requirement using plasmas is widely used. However, the problem is a of the polymer adhered in dry etching and the like remains. about a circuit delay or a continuity fault of wiring. significantly degrading the service life.

Detailed Description Text - DETX (154):

ಡ In FIG. 28, W denotes a silicon substrate, reference numeral 432 denotes an NOX denotes a barrier metal surface oxide film, and RS denotes a **polymer** dreg. Reference numeral 437 denotes consisting of a CVD oxide film, reference numeral 440 denotes a contact hole, reference numeral 433 denotes a gate oxide film consisting of a silicon heat barrier metal, reference numeral 435 denotes a first inter-layer oxide film oxide film of 10 nm in thickness, reference numeral 434 denotes a gate clement separation oxide film consisting of a silicon heat oxide film, electrode consisting of a polycrystal silicon.